

UNITED STATES DEPARTMENT OF THE INTERIOR
BUREAU OF MINES

**Mineral-resource of the Arnold Mesa Rare II Further
Planning Area, Yavapai County, Arizona**

U.S. Bureau of Mines Mineral Land Assessment
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By
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This open file report summarizes the results of a Bureau of Mines wilderness study and will be incorporated in a joint report with the U.S. Geological Survey. The report is preliminary and has not been edited or reviewed for conformity with the U.S. Bureau of Mines editorial standards. Work on this study was conducted by personnel from Intermountain Field Operations Center, Building 20, Denver Federal Center, Denver, CO 80225.

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MINERAL-RESOURCE POTENTIAL OF THE ARNOLD MESA RARE II
FURTHER PLANNING AREA, YAVAPAI COUNTY, ARIZONA

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FOREWARD

The U.S. Bureau of Mines and U.S. Geological Survey jointly conduct mineral surveys of land which in the U.S. Forest Service Roadless Area Review and Evaluation (RARE II) program have been designated for further planning. These evaluations are used in the RARE II program which conforms with the Multiple-Use Sustained-Yield Act of 1960 (74 Stat. 215; 16 U.S.C. 528-531), the Forest and Rangeland Renewable Resources Planning Act of 1974 (88 Stat. 476, as amended; 16 U.S.C. 1601 note), and the National Forest Management Act of 1976 (90 Stat. 2949; 16 U.S.C. 1600 note). Reports on these surveys provide the President, Congress, the U.S. Forest Service, and the general public with information essential for determining the suitability of land for inclusion in the National Wilderness Preservation System

This report is on the Arnold Mesa RARE II Further Planning Area, Yavapai County, Arizona.

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INTRODUCTION

During the summer and fall of 1980, the U.S. Bureau of Mines (USBM) conducted a mineral-resource appraisal of the Arnold Mesa RARE II Further Planning Area, Yavapai County, Arizona (fig. 1).

Mines, prospects, and mineralized zones were examined within the RARE II area and its vicinity (pl. 1). Most of the mine workings were not accessible. Twenty-five samples were taken and evaluated by spectrographic, chemical, and fire-assay analyses. USBM analytical results are on file at the U.S. Bureau of Mines, Intermountain Field Operations Center, Denver, Colorado 80225.

Useful information on mineral occurrences and mine production was obtained from the literature. Maps and publications of the U.S. Geological Survey and Arizona Bureau of Mines (now Arizona Bureau of Geology and Mineral Technology) proved valuable, as did reports from the Arizona Department of Mineral Resources and from the USBM. Information on the Squaw Peak property from these sources and a thesis from the University of Arizona by Roe (1976) were particularly valuable.

Location, size, and geographic setting

The RARE II area lies near the geographical center of Arizona in eastern Yavapai County, 4 miles (6.5 km) east of Interstate Highway I-17, and approximately 70 miles (110 km) from either Flagstaff or Phoenix (fig. 1). The nearest town is Camp Verde, Arizona (pop. 900), 5 miles (8 km) north.

Arnold Mesa RARE II area includes 28,320 acres (11,610 ha), or just over 44 square miles (114 km²). Of this area, 320 acres (131 ha) are within the Tonto National Forest, and the remainder in the Prescott National Forest.

The RARE II area follows the northwesterly trend of the Black Hills (pl. 1), a rough and mountainous plateau, ranging from 4,400 to 5,600 feet (1,320 to 1,680 m) in elevation. The highest summit in the vicinity, Squaw

Peak, lies just north of the area at an elevation of 6,525 ft (1,958 m). The lowest point is on the Verde River at the southeast edge of the RARE II area at approximately 2,600 ft (780 m) elevation. The cliffs which form the Verde Rim drop to the Verde River on the northeast side of the plateau. From the Verde River, several canyons have cut deeply back into the plateau and have formed almost impassible cliffs and gorges along the Rim.

Topographic relief ranges from less than 200 ft per mile (38 m per km) on the plateau surface to more than 2,000 ft per mile (380 m per km) on steeper parts of the rim.

Jeep trails and Forest Service roads provide reasonable access to the perimeter of the area; the interior portions, however, are accessible only by foot, horse, or helicopter.

Mining activity

Prospecting and claim-staking, the principal mining activities, have occurred intermittently from about the mid-1800's up to the present. No mine production is known from within the RARE II area; and during the field examination, no mining or exploration work was occurring within the RARE II boundary.

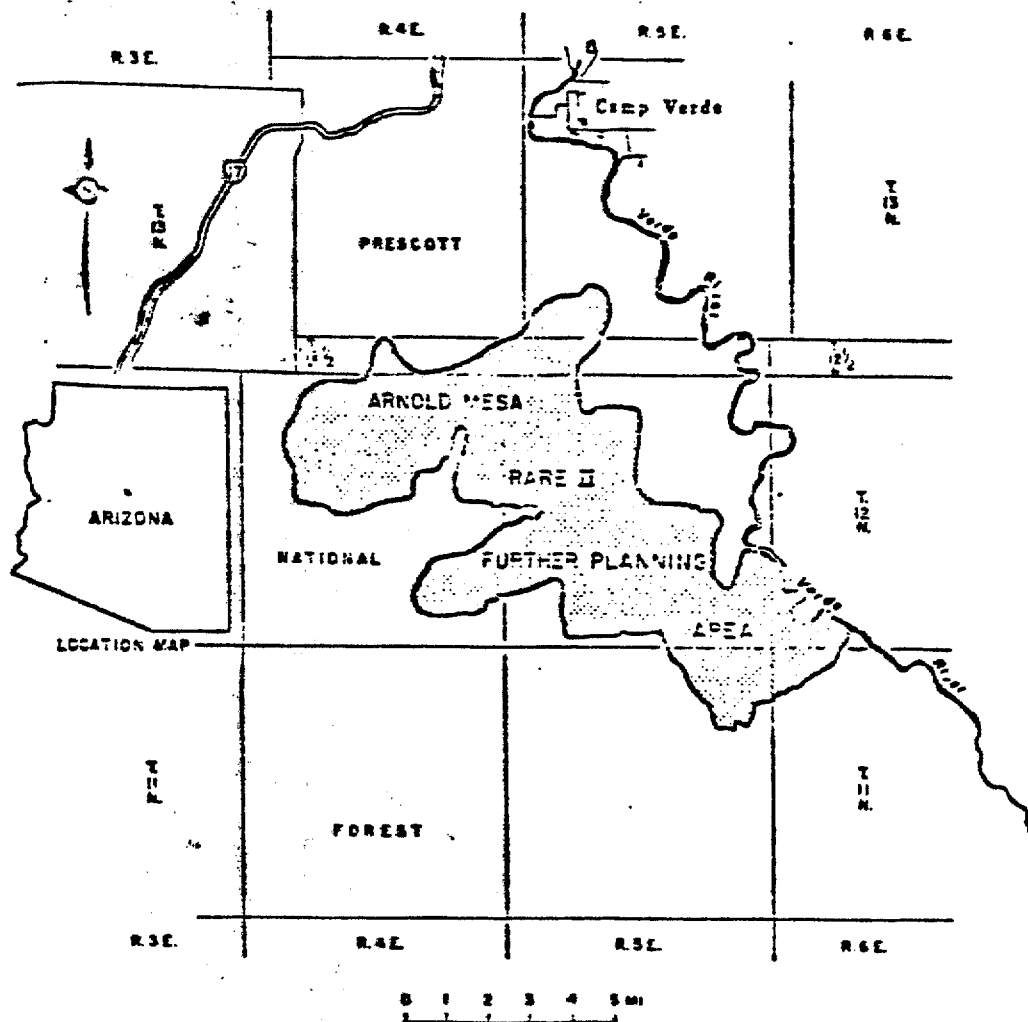


Figure 1.-Index map of Arnold Mesa RARE II Further Planning Area, Yavapai County, Arizona.

MINING DISTRICTS AND MINERALIZED AREAS

Although most of the Arnold Mesa RARE II Further Planning Area falls within the Squaw Peak Mining District, the known mineralized portions of the District lie outside of the RARE II area boundary. Three mineralized areas at the Squaw Peak, Rustler, and Wire Gold Mines account for most of the local mining activity and for nearly all of the 98 claims identified from the County records. Based on descriptions, the remaining claims are randomly distributed inside the area, but vagueness, and the general lack of development work or adequate monumentation, prevented their identification on the ground.

Two adits near the Rustler Mine were the only prospects found inside the RARE II area. No mineral production is known from either site. Limited mineral production is known from the Squaw Peak, Rustler, and Wire Gold Mines which are outside, but near the RARE II area boundary. Fringe claims from these properties extend into the RARE II area, and a potential for similar deposits inside the area can be inferred where the geology is favorable.

Squaw Peak Mine

Roughly one-quarter of the Squaw Peak claims, centered in secs. 29 and 30, T. 13 N., R. 5 E., extend into the RARE II area, but none of the mine workings or known reserves do.

Because safe entry into the Squaw Peak mine was not possible at the time of examination, literature sources, primarily Hill (1949) and Roe (1976), are the basis for the mine description and production history.

Exploration work conducted by Phillips Petroleum Co., and Essex International, Inc., during the early 1970's resulted in estimated reserves at Squaw Peak of 20 million tons (18.2 million t) averaging 0.36-percent copper with substantial molybdenum (Roe, 1976).

Roe (1976) does not give an average grade for molybdenum, but based on the reported production of 5.40 dry tons (4.91 t) of 98.92-percent molybdenite recovered from 1,000 tons (910 t) of ore (Hill, 1949), it must have been 0.5 to 0.6-percent MoS_2 in the ore zone. The reserve estimate is based on more than 16,000 ft (4,800 m) of diamond drilling, detailed geologic mapping, geochemical studies, and 43,000 line-feet (12,900 m) of induced polarization work. Roe (1976) further states that the chief economic minerals are chalcopyrite and molybdenite occurring mainly in a moderately to highly fractured, north-trending, subelliptical, 1,200- to 800-ft (360- by 240-m) mineralized and altered zone surrounding an intrusive stock of Laramide(?) age.

Before 1916, the property was active, though no production was recorded until 1944-46, following a \$20,000 Reconstruction Finance Corporation loan (Hill, 1949, p. 2). In 1946, there were more than 4,000 ft (1,200 m) of underground workings, and the total production from treating 1,000 tons (910 t) of ore was 5.40 dry tons (4.91 t) of 98.82-percent molybdenite (MoS_2) and 36.034 tons (33.07 t) of copper concentrate averaging 22.85-percent copper, 1.92 oz. silver per ton and 0.016 oz. gold per ton (Hill, 1949).

During the USBM study, 13 samples were taken from underground workings, dumps, and mineralized outcrops on the Squaw Peak claims. Five samples from the accessible portions of two adits, and eight samples from numerous cuts and pits were taken; and approximately 300 ft (90 m) of mine workings were mapped. Copper and molybdenum values ranging from 1.47 percent to 0.01 percent confirmed the presence of these metals in the amounts previously reported.

Rustler Mine

The Rustler Mine group consists of three patented lode-mining claims and many adjoining unpatented claims, extending end-to-end along the RARE II area boundary in sec. 5, T. 12 N., R. 5 E., and in sec. 32, T. 12-1/2 N., R. 4 E.

Approximately 20 of these claims lie within the RARE II area. Mine workings consist of a pit, or quarry, on the patented Rustler claim, roughly 100 ft (30 m) wide, 200 ft (60 m) long, and 50 ft (15 m) deep; and two adits about 600 ft (180 m) apart which lie 1,000 ft (300 m) southwest of the patented claims. No evidence of mineralization was observed in the sheared tonalite exposed in the pit or the two adits. No gold, molybdenum, or zinc, and only traces of other metals were found in the samples collected at the pit. Developing a source of aggregate appeared to be the purpose of the pit operation.

One adit is caved about 10 ft (3 m) from the portal, and the other extends about 80 ft (24 m) into the hillside. Two samples were taken at each site. The highest values found were 0.04-percent copper, 0.3-percent lead, 0.008-percent molybdenum, 0.003-percent silver, and 0.5-percent zinc. No gold was found in the four samples.

Chicken Wire Gold Mine

Two lode-mining claims, one patented and three unpatented, constitute the property of the Chicken Wire Gold Mine in sec. 33, T. 13 N., R. 4 E., located a half-mile (0.8 km) north of the RARE II area.

Narrow, generally flat-lying quartz veins and stringers in Precambrian tonalite have been exposed and mined by means of several small, underground workings. Approximately 500 ft (150 m) of workings were accessible at the time of the USBM evaluation, with additional workings either caved or back-filled.

Gold and silver values in three samples taken on the main vein ranged from 0.06 to 1.31 oz gold per ton and 0.2 to 1.4 oz silver per ton. Antimony, arsenic, bismuth, lead and zinc were detected in the samples but were only slightly anomalous. Copper oxide minerals were visible in portions of the workings, but were considered too sparse to justify sampling.

Production from the property is not recorded, but was probably small. The current owners stated that high-grade native gold worth a few hundred to a few thousands of dollars were produced from a few pockets in the mine (W. F. Colcord, 1980, oral commun.). The current, part-time mining at the property is essentially exploration work.

ASSESSMENT OF MINERAL-RESOURCE POTENTIAL

Most of the RARE II area is covered by a thick, post-mineral basalt which prevents effective evaluation of potential host rocks beneath. No evidence of economic mineralization has been found in the area. Figure 2 shows the preliminary mineral-resource potential determined by the USBM study.

Studies of metallic and nonmetallic deposits adjacent to the area; however, suggest possible resources within. A low potential exists in the northeast part of the area for copper-molybdenum stockwork deposits, quartz veins with gold and associated silver, rock suitable for making crushed aggregate, sand and gravel, and geothermal energy.

Potential for gold deposits similar to those at the Chicken Wire Gold mine is considered low and is based largely on the presence of identical host rocks within the planning area in proximity to this mine. Negative factors include the apparent lack of mineralization at any distance from either property and the low grade and limited tonnage at each mine. Known mineral resources at both mines are uneconomic at the present time.

Rock suitable for crushing into aggregate, and deposits of sand and gravel occur within the RARE II area. However, the deposits could not be produced economically because similar deposits occurring outside the area are more accessible and closer to markets.

Ross and Harrar (1980) indicate on their map a potential geothermal-resource area which partly is in the southeast portion of the RARE II area lying along the Verde River (fig. 2). Their findings were based on geochemical sampling of water from wells and springs. They state that the geochemical evidence was not conclusive and further work would be needed to confirm their findings.

No potential is known within the area for energy minerals, evaporite deposits, or other types of metallic or nonmetallic occurrences. Evaporite deposits occur on the north side of the northwest-trending Verde Fault outside the area. If such deposits ever did extend south of the fault, they have been removed by erosion. Likewise, any oil and gas potential in the vicinity is confined to geologic units north of the Verde Fault.

Nothing suggesting the presence of other types of metalliferous or non-metalliferous deposits of interest was found or indicated by the USBM study.

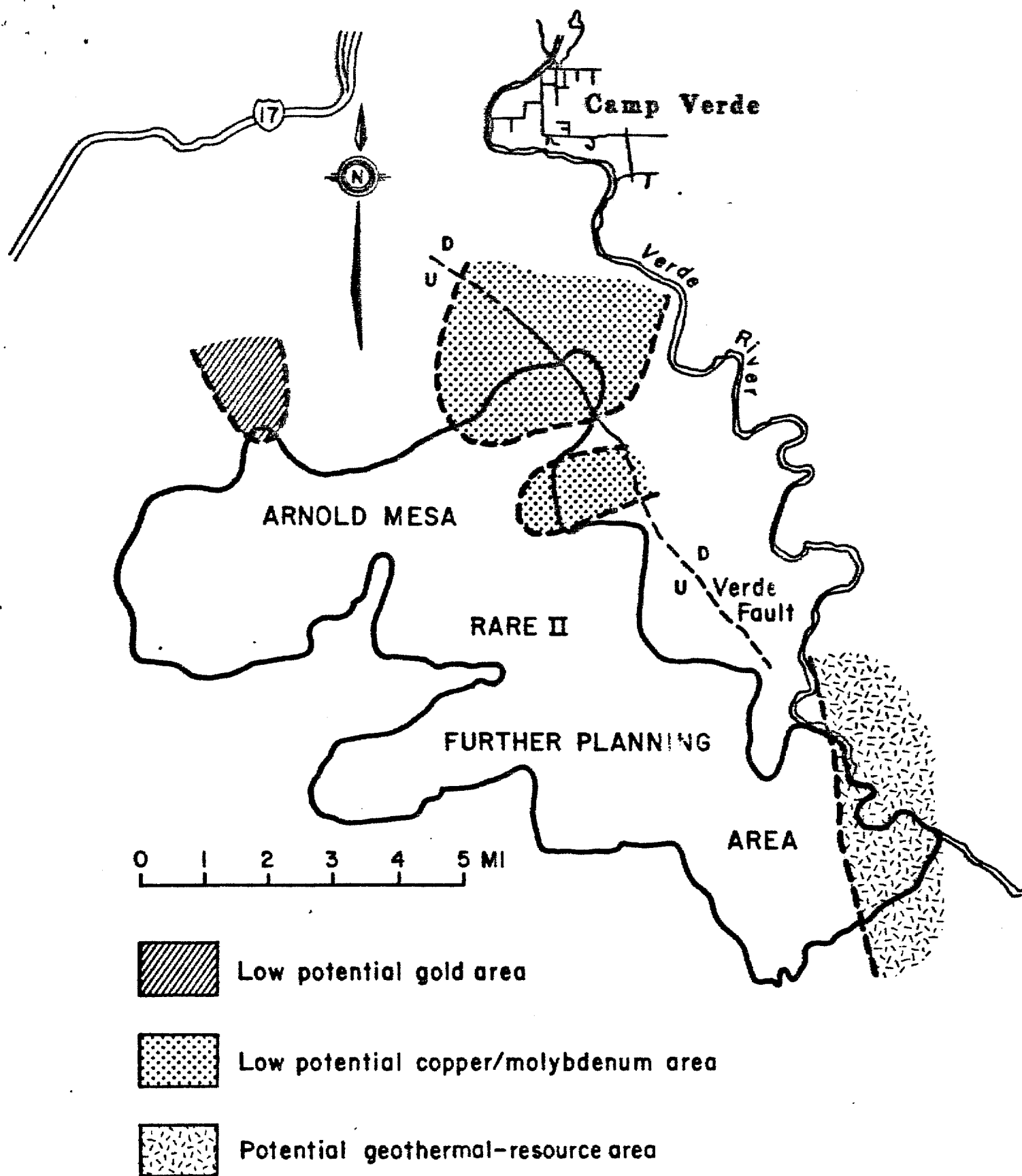


Figure 2.-Map showing preliminary mineral-resource potential of Arnold Mesa RARE II Further Planning Area.

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